AD-A286 344

DTIC
ELECTED
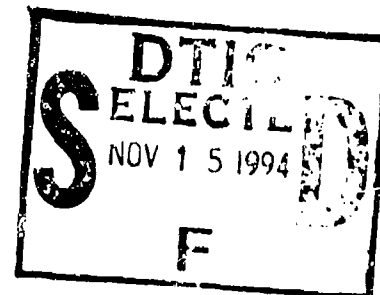NOV 1 5 1994
F

Trainer's Guide for the Device-Based, Time-Compressed Army National Guard Tank Gunnery Training Strategy

94-35140

October 1994

Reserve Component Training Research Unit
Training Systems Research Division

U.S. Army Research Institute for the Behavioral and Social Sciences

94 1114 063

U.S ARMY RESEARCH INSTITUTE
FOR THE BEHAVIORAL AND SOCIAL SCIENCES

A Field Operating Agency Under the Jurisdiction

of the Deputy Chief of Staff for Personnel

EDGAR M. JOHNSON
D.rector

Research accomplished under contract
for the Department of the Army

Human Resources Research Organization

Technical review by

Ronald E. Kraemer
CPT Mark Leonard

REPORT DOCUMENTATION PAGE

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED	
	1994, October	Final	Oct 93 – Jun 94

4. TITLE AND SUBTITLE	5. FUNDING NUMBERS
Trainer's Guide for the Device-Based, Time-Compressed Army National Guard Tank Gunnery Training Strategy	MDA903-92-D-0075 63007A 793

6. AUTHOR(S)	
Morrison, John E. (HumRRO); and Hagman, Joseph D. (ARI)	2125 C01

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)	8. PERFORMING ORGANIZATION REPORT NUMBER
Human Resources Research Organization 66 Canal Center Plaza, Suite 400 Alexandria, VA 22314	FR-PRD-94-13

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSORING/MONITORING AGENCY REPORT NUMBER
U.S. Army Research Institute for the Behavioral and Social Sciences ATTN: PERI-ID 5001 Eisenhower Avenue Alexandria, VA 22333-5600	ARI Research Product 95-04

11. SUPPLEMENTARY NOTES

Performed under subcontract to BDM Federal, Inc.

12a. DISTRIBUTION/AVAILABILITY STATEMENT	12b. DISTRIBUTION CODE
Approved for public release; distribution is unlimited.	--

13. ABSTRACT (Maximum 200 words)

This report is a guide for trainers in Army National Guard (ARNG) armor units for a device-based gunnery training strategy. The purpose of the strategy is to reduce or compress the time required to prepare for tank crew gunnery qualifications (i.e., Table VIII). The strategy compresses the required training time by (a) limiting training to those skills and knowledges needed for successful Table VIII performance, (b) focusing training on Table VIII engagements that are most difficult to ARNG crews to perform, and (c) allocating device training time to crews that need it most and away from crews that are demonstrably proficient on the training device. The strategy is designed to be implemented at the local level with either the Conduct-of-Fire Trainer (COFT) or the Guard Unit Armory Device Full-Crew Interactive Simulation Trainer, Armor (GUARDFIST I).

14. SUBJECT TERMS		15. NUMBER OF PAGES
Reserve component	Table VIII	18
Tank gunnery	Army National Guard	16. PRICE CODE
Armor training	Training strategy	--

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	Unlimited

Trainer's Guide for the Device-Based, Time-Compressed Army National Guard Tank Gunnery Training Strategy

John E. Morrison
Human Resources Research Organization

Joseph D. Hagman
U.S. Army Research Institute

Reserve Component Training Research Unit
Ruth H. Phelps, Chief

Training Systems Research Division
Jack H. Hiller, Director

U.S. Army Research Institute for the Behavioral and Social Sciences
5001 Eisenhower Avenue, Alexandria, Virginia 22333-5600

Office, Deputy Chief of Staff for Personnel
Department of the Army

October 1994

iii

The Army National Guard (ARNG) is seeking to place greater emphasis on the use of training devices to enhance homestation M1/M1A1 tank gunnery training. To help ensure the success of this approach, ARNG armor unit trainers need "how to" guidance on the use of specific devices to maximize training effectiveness and efficiency. This product provides such guidance in the form of a trainer's guide for implementing a device-based training strategy designed to reduce or compress the time required to prepare ARNG tank crews for live-fire Table VIII qualification.

This research was conducted by the U.S. Army Research Institute for the Behavioral and Social Sciences Reserve Component (RC) Training Research Unit, whose mission is to improve the effectiveness and efficiency of RC training through use of the latest training technology. The research task supporting this mission, titled "Train Up: Technology-Based RC Training Strategies" is organized under Science and Technology Objective V.B.7, Unit Training Strategies.

The National Guard Bureau (NGB) sponsored this research under a Memorandum of Understanding signed 12 June 1985. Results have been presented to Chief, Training Division, NGB; Chief, Training Division, Office of the Chief, Army Reserve; and Special Assistant to the Commanding General, U.S. Army Armor Center.

EDGAR M. JOHNSON
Director

TRAINER'S GUIDE FOR THE DEVICE-BASED, TIME-COMPRESSED ARMY
NATIONAL GUARD TANK TRAINING STRATEGY

CONTENTS

Trainer's Guide for the Device-Based, Time-Compressed
Army National Guard Tank Gunnery Training Strategy

Overview

The U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) has developed a device-based training strategy for use by Army National Guard (ARNG) units. The purpose of this strategy is to reduce or compress the time required for ARNG units to prepare for tank crew gunnery qualifications (i.e., Table VIII). The strategy compresses the required training time by

- limiting training to those skills and knowledges needed for successful Table VIII performance,

- focusing training on Table VIII engagements that are most difficult for ARNG crews to perform, and

- allocating device training time to crews that need it most and away from crews that are demonstrably proficient on devices.

This guide helps you (the ARNG trainer) to implement the training strategy in your unit. Depending on your situation, you can use either of two computer-based devices: the Conduct-of-Fire Trainer (COFT) or the Guard Unit Armory Device Full-Crew Interactive Simulation Trainer, Armor (GUARDFIST I). If both devices are available to you, use both to increase the time that crews have on a training device. Note, however, that, unless otherwise specified, the training described in this guide can be implemented on either device.

The training procedures described in this guide assume that the training device instructor/operator (I/O) can randomly access individual exercises in the COFT or GUARDFIST I training matrix. Make sure that the I/O knows the special procedures to call up specific exercises.

Prepare for the Training Strategy

Prepare to implement the strategy by obtaining related documents and by scheduling inactive duty training periods.

■ **Related documents.** Obtain and read two other documents that pertain to the present strategy:

- An ARI technical report that provides the detailed rationale behind the strategy (Morrison & Hagman, 1994). Read this document to obtain a deeper understanding of the strategy. This is particularly important if you need to modify the strategy to suit your particular training situation.

- A knowledge workbook for use by the individual crewmen being trained by this strategy (Pope, 1994). The workbook helps soldiers to prepare for device training and to transfer what they learn on the device to the operational equipment. Duplicate this publication and provide it to your personnel before starting the strategy.

■ **Training schedule.** Set aside 3 *consecutive* IDT periods for the training strategy. To have maximum impact on Table VIII performance, these IDT periods should occur just before the Annual Training (AT) period. Also, schedule the Tank Crew Gunnery Skills Test (TCGST) for the IDT period immediately before the start of the strategy.

Figure 1 illustrates the sequence of training and testing events required by the strategy. The following sections describe the specific actions that you need to take to implement this strategy.
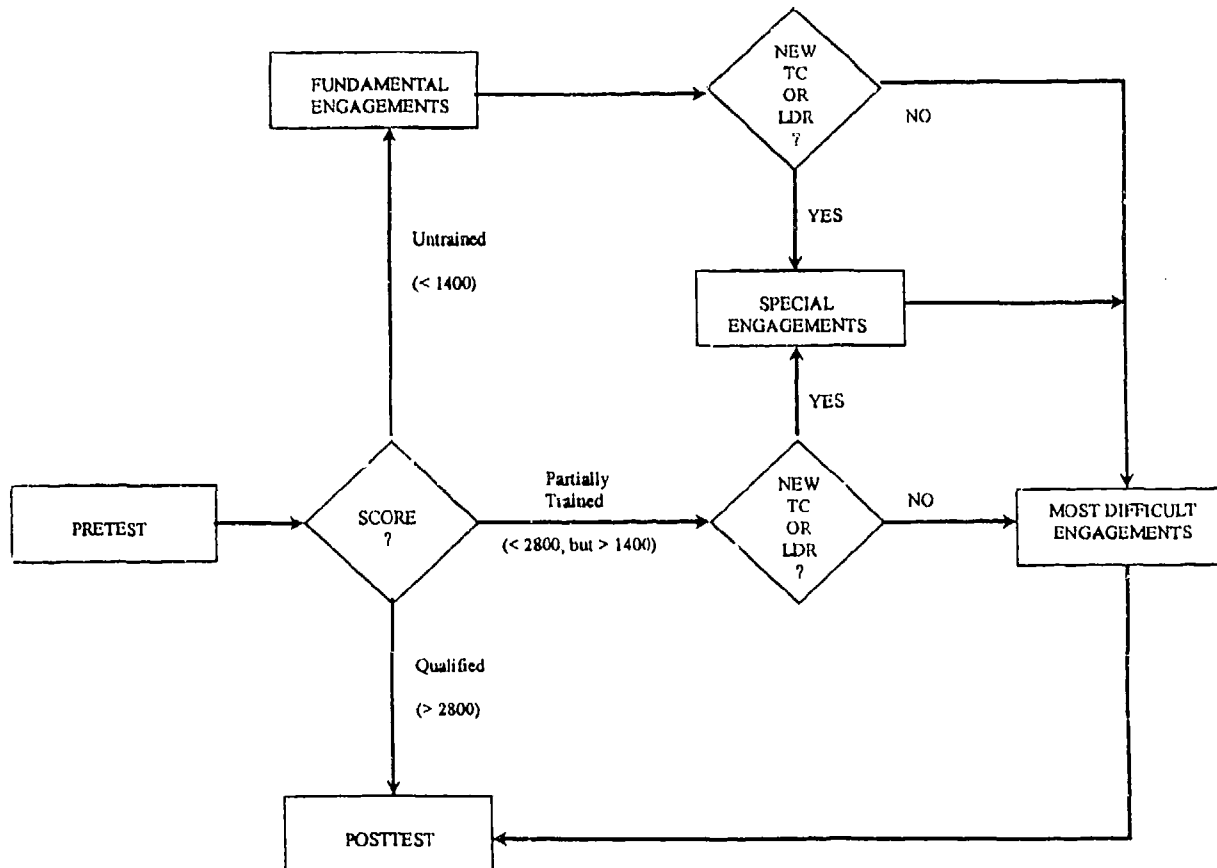

Figure 1. Sequence of training and testing events in the training strategy.

Administer Device-Based Tests

As shown in Figure 1, the strategy begins and ends with device-based tests of gunnery proficiency. These tests assess the proficiency of your crews on the devices and determine their readiness for live-fire training on the tank. Conduct these device-based tests as if they were actual Table VIII qualification runs. This means that you must

- test each crew in exactly the same (i.e., standardized) manner,

- avoid prompting crews or providing hints during the test,

- refrain from providing performance feedback until the entire test is completed, and

- maintain accurate records of performance.

The device-based test consists of four simulated runs through Table VIII and requires about 1 hr to complete. Depending on the device you are using to train, select the following exercises for the tests:

- COFT: Select two different exercises from Gate Exercises 130-135 and two more from Gate Exercises 136-139.

- GUARDFIST I: Select Evaluation Exercises 6E1 (Table VIIIA) and 6E2 (Table VIIIB) and administer four times each.

As described below, the device-based test is administered at two points in the strategy: at the beginning (the pretest) and at the end (the posttest).

■ **Pretest.** To assess initial proficiency on the training device, administer the device-based pretest to all crews *before* starting the strategy. Combine the device-based pretest with the TCGST. In other words, set aside one TCGST testing station for the device-based pretest and test crews individually. To receive a "GO" on the pretest, a crew must score 2800 total points, which corresponds to an average of 700 over the four simulated Table VIII tests.

■ **Posttest.** To verify that crews are proficient on the device, administer a second device-based test to all crews *after* they complete their assigned training. This posttest is identical to the pretest except that you administer it after crews finish their assigned device training. If crews pass the posttest, excuse them from further device training and reassign the device to crews that need more device training.

Sort Crews on Pretest Performance

Assign specific exercises on the training device by sorting the crews on their pretest performance. Sort the crews *after* they complete the pretest but *before* they start device training. Use the following three categories:

■ **Qualified crews.** Classify crews as provisionally qualified on the device if they score 2800 or more points on the pretest. To verify their status, administer the device-based posttest during the first IDT period. If they pass the posttest, consider them proficient on the device and do not assign them further device training. Instead assign these crews workbook activities or schedule them for training on driving and loading. (See later sections in this guide.) If crews fail the device-based posttest, consider them "partially trained" and treat them as described below.

■ **Partially trained crews.** Classify crews as partially trained on the device if they score fewer than 2800 points but more than 1400 points on the pretest. Crews in this category are not deficient in basic gunnery skills, but would nevertheless benefit from device training. Accordingly, you should limit device training for these crews to the most difficult engagements. Table VIII has four types of difficult engagements:

- On the defense, engage simultaneous targets with the main gun and TC's caliber .50 (Task A2).

- On the offense, engage two sets of troops using the coax machine gun (Task A3).

- On the offense and under NBC conditions, engage a stationary APC with the main gun and troops with the coax machine gun (Task B3).

- On the defense, engage a stationary and a moving tank target with the main gun using battlesight gunnery and the GAS (Tasks A1 & B5).

■ **Untrained crews.** Classify crews as untrained if they score 1400 or fewer points on the pretest. These crews are deficient in basic gunnery skills and are therefore assigned practice on the fundamental engagements of Table VIII. Fundamental engagements are those that do not present significant complicating or unusual conditions. Table VIII has two types of fundamental engagements:

- On the offense, engage stationary or moving tanks with the main gun using precision gunnery (Tasks A4, A5S, A5A, & B4).

- On the defense, engage a moving tank with the main gun using precision gunnery (Task B5A).

4

Assign Special Training as Needed

You may assign additional device exercises on two special engagements from Table VIII. These engagements are somewhat complicated, yet they are not difficult to perform. They are "special" engagements in that they are trained only under certain circumstances:

■ **Engage APC targets in the defense.** The complicating condition in this engagement (Task B2) is that the crew must interact to unload sabot and reload HEAT ammunition before starting the engagement. Assign this engagement only if the loader is inexperienced and you are using GUARDFIST I to train. GUARDFIST I provides limited training on loading. Supplement this training with concurrent training using dummy rounds of ammunition. (See later section in this guide.)

■ **Engage tank with a three-man crew.** This engagement (Task B1S) is unusual in that the crew must engage targets in a nonstandard (i.e., three-man) crew configuration. Assign this engagement only if TC has had limited experience as a gunner.

Conduct Device-Based Training

Assign partially trained and untrained crews device exercises listed in Figures 2-4. Note that, in some instances, the figures specify two or more different exercises to train the same engagement. Unless otherwise instructed, you may choose any one of the appropriate exercises to train crews. You may also alternate among different exercises to provide variety in training conditions.

In contrast to device-based testing, feel free to interact with crews as they train. Be sure to provide feedback on performance and to coach crews when necessary. However, keep your comments focused on Table VIII performance. For instance, you may point out how behavior on device-based engagements would or would not be appropriate for performance on similar engagements on Table VIII.

☐ Note. COFT users, be aware that the COFT exercises listed in Figures 2-4 contain engagements other than the ones indicated. For instance, Exercises 102 (offensive-normal) and 106 (offense-night) contain both coax and main gun targets and are selected to train both types of engagements. For the present strategy, you must highlight performance on engagements being trained at the moment and downplay performance on other types of engagements.

■ **Qualified crews.** If crews pass the posttest, excuse them from further device training. Assign these crews to related training activities.

■ **Partially trained crews.** Train these crews on the special and difficult engagements by following the steps described below:

Step 1. If crews do not require training on special engagements, go to Step 2. Otherwise, select exercises identified in Figure 2 and follow the instructions in 1a and 1b as appropriate.

Device Exercises		Special Engagement
COFT	GUARDFIST I	
---	6B2	On the defense, engage two stationary APCs with the main gun using precision gunnery.
103, 107, & 119	6B1	On the defense, engage a stationary tank target with a three-man crew using precision gunnery.

Figure 2. Device exercises for training special engagements.

□ **Note.** Although COFT allows the TC and gunner to practice the APC engagement, it does not provide a role for the loader. Consequently, do not use COFT to train the first special engagement.

    a. If the loader is inexperienced and you are using GUARDFIST I, provide training on Exercise 6B2 and continue training until the crew is proficient on the engagement, with the stipulation that training on this engagement not exceed 1 hr. *Crews are considered proficient on an engagement if they destroy relevant targets (i.e., targets appropriate for the engagement being trained) on two consecutive attempts without committing a procedural error.* Allow crews a short (5 min) break after reaching proficiency or at the end of the hour block.

    b. If the TC needs training on the three-man engagement, use either device to provide training on the exercises specified in Figure 2. Train to proficiency but do not exceed 1 hr on this engagement. Then rest for 5 mins before proceeding to Step 2.

Step 2. Train crews on the four most difficult engagements as described below.

    a. Train the first three difficult engagements in the order presented in Figure 3. Train each engagement to proficiency (see Step 1a) but not longer than 1 hr. Allow approximately 5 mins to rest before going to the next engagement. If you are using GUARDFIST I, go to Step 3. If you are using COFT, go to Step 2b.

6

| Device Exercises | | Difficult Engagement |
COFT	GUARDFIST I	
102 & 106	6A2	On the offense, engage two sets of troops using the coax machine gun.
110	6B3	On the offense and under NBC conditions, engage a stationary APC with the main gun and troops with the coax machine gun.
113 & 117	6A1	On the defense, engage a stationary and a moving tank target with the main gun using battlesight gunnery and the GAS.
101 & 111	---	On the defense, engage simultaneous targets with the main gun and TC's Caliber .50.

Figure 3. Device exercises for training most difficult engagements.

□ **Note.** GUARDFIST I cannot provide training on the simultaneous engagement because the TC's Caliber .50 does not function.

      b. Train *both* COFT exercises that relate to the simultaneous engagement:

- Exercise 111 (defense-Caliber .50) provides the TC practice using his machine gun. Continue training until the TC reaches proficiency, but do not exceed 30 mins on this exercise.

- Exercise 101 (defense-normal) exercise presents a variety of main gun and machine gun engagements--not just simultaneous engagements. Alert the crew to engage targets simultaneously whenever the appropriate target array appears. Continue training until the gunner and TC reach proficiency (see Step 1a), but do not exceed 30 mins on this exercise.

Step 3. Conduct the device-based posttest. Assign crews that pass the posttest to other training activities. For those that fail the posttest, take one of the following courses of action:

      a. If the device is not being used by other crews, use the device to retrain the crews. However, limit training to only the types of engagements that they executed poorly on the posttest.

      b. If the device is in use (more likely), provide an after-action review that includes advice for improving performance on Table VIII.

■ Untrained crews. Start training these crews on the fundamental engagements as described below.

Step 1. Train each of the fundamental engagements in the order presented in Figure 4. Continue training on each engagement until the crew is proficient on the engagement, with the stipulation that training on this engagement not exceed 1 hr. *Crews are considered proficient on an engagement if they destroy relevant targets (i.e., targets appropriate for the engagement being trained) on two consecutive attempts without committing a procedural error.* Allow crews a short (5 min) break between the offensive and defensive exercises.

Device Exercises		Fundamental Engagement
COFT	GUARDFIST I	
102, 106, & 110	6A2, 6A4, 6A5, & 6B4	On the offense, engage stationary or moving tanks with the main gun using precision gunnery.
105	6B5	On the defense, engage a moving tank with the main gun using precision gunnery.

Figure 4. Device exercises for training fundamental engagements.

Step 2. Train the special engagements as necessary. Follow Step 1 for partially trained crews.

Step 3. Train the difficult engagements. Follow Step 2 for partially trained crews.

Step 4. Conduct the device-based posttest. If crews pass the posttest before the end of the 3-IDT period, assign them to other related training activities. For those that fail the posttest, take one of the following courses of action:

a. If the device is not being used by other crews, use the device to retrain the crews. However, limit training to only the types of engagements that they executed poorly on the posttest.

b. If the device is in use (more likely), provide an after-action review that includes advice for improving performance on Table VIII.

8

Use Workbook Materials	The knowledge workbook supplements device training. Use the workbook to

- provide soldiers an introduction to the background and goals of the training strategy,

- prepare those soldiers for training on the device. thereby making training time more productive, and

- help the soldier transfer the skills and knowledges learned on the device to performance on the tank.

Provide the workbook to each soldier before starting the training strategy, and instruct him to hold onto it throughout training. Encourage soldiers to study and complete the workbook while they wait to participate in device training or other concurrent training (see below). They should also review the workbook before starting live-fire gunnery training on the exercises leading up to Table VIII.

Conduct Concurrent Training for Drivers and Loaders

The device-based training described in this guide is *not* sufficient for training tank drivers and loaders. COFT provides no training for the driver and loader, and GUARDFIST I provides only a low-fidelity simulation of loader and driver tasks. To compensate, you should conduct concurrent training on those tasks.

The most effective concurrent training for these tasks is on the tank. Loaders can practice loading and unloading on a static tank using dummy rounds of ammunition. If there are open areas near the armory, drivers can practice moving from turret-down to hull-down positions for defensive engagements and maintaining a steady gunnery platform on offensive engagements.

If crews qualify early in the strategy, begin training them on these tasks immediately. If they have not finished device training, conduct this training concurrently. The procedure for concurrent training depends on whether you are using the COFT or GUARDFIST I to train.

- COFT: Drivers and loaders do not participate in device training. Consequently, they can start concurrent training at the beginning of the 3-IDT training period.

- GUARDFIST I: Drivers and loaders are needed during device training. Therefore, they can participate in concurrent training either while they wait for device training or after they complete the posttest.

9

| **Conduct Live-Fire Training** | The present strategy does *not* substitute for live-fire training. After completing device training, schedule on-tank, live-fire exercises as prescribed in FM 17-12-1 to prepare crews for Table VIII. These on-tank exercises are important in that they provide practice on gunnery skills that are not well trained on the devices. Such skills include (but are not limited to) |

- acquiring targets from the open-protective position,

- the physical aspects of loading, and

- the effects of tank movement and gun recoil.

Preliminary Combat Tables IV-VII prepare crews for Table VIII. Given sufficient time and resources, you should complete all four tables, using live-fire ammunition. If you must curtail live-fire gunnery, consider including, at a minimum, the following two tables:

- Table V provides needed practice on machine gun engagements, which are particularly difficult for ARNG crews to perform.

- Table VII provides practice on most of the conditions and tasks of Table VIII.

References   Department of the Army (1993). <u>Tank gunnery (Abrams),</u>
<u>Volume II</u> (FM 17-12-1-2). Washington, DC.

Morrison, J. E., & Hagman, J. D. (1994). <u>A device-based, time-</u>
<u>compressed strategy for Army National Guard Training</u> (ARI
Technical Report 1012). Alexandria, VA: U.S. Army Research
Institute for the Behavioral and Social Sciences.

Pope, G. E. (1994). <u>Tank gunnery workbook</u> (HumRRO Draft
Final Report). Alexandria, VA: Human Resources Research
Organization.